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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/593,275	06/13/2000	Upendra V. Chaudhari	YOR-2000-0168US1	7772
35195	7590	03/16/2005	EXAMINER	
FERENCE & ASSOCIATES 400 BROAD STREET PITTSBURGH, PA 15143			HAN, QI	
			ART UNIT	PAPER NUMBER
			2654	

DATE MAILED: 03/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/593,275

Applicant(s)

CHAUDHARI ET AL.

Examiner

Qi Han

Art Unit

2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-12, 14-16, 19-25 and 27 is/are rejected.
- 7) ☒ Claim(s) 4-5, 13, 17, 18, 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/08/2004 has been entered.

Response to Amendment

2. The Applicant(s) amended claims 1-2, 14-15 and 27 (see amendment: pages 3-10), and filed the RCE examination request on 12/08/2004.

The amendment (see page 2) regarding equitation 1 on page 8 in the specification is still incorrect (the rightmost parenthesis of function P is missing), so that the objection will be retained.

The examiner withdraws the specification objection regarding claim 1, 14 and 27, because the applicant amended claims.

Response to Arguments

3. Applicant's arguments with respect to claims 1-27 have been fully considered but they are not persuasive.

Regarding Rejection under 35 USC 103:

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In response to applicant's arguments (page 14-16) regarding the amended independent claims 1, 14 and 27, that "there is not, (in the prior art), however, having multiple levels of phonetic detail in accordance with the present invention" (page 15, paragraph 2), and "this hierarch approach ... is simply not taught or suggested by either Goldethal or Newman (page 16, paragraph 1), the examiner should pointed out that the specification might disclose a different recognition approach from the references, but the applicant fails to distinguish the difference(s) between the prior art teachings and the broad interpretation of the claimed limitations. In this case, the combined prior art disclosure teaches all claimed limitations based on reasonable broadest interpretation of the claim (see detail in the claim rejection).

In response to applicant's arguments regarding "the motivation to combine" (page 15, paragraph 3), it is noted that applicant does not give specific reason(s) for the arguments, so that the examiner cannot further provide specific response regarding this issue, even though the examiner disagrees with applicant and has a different view of prior art teachings and claim interpretation. As a general response, it is pointed out that the both cited references are in the same field of endeavor, which is in speaker recognition art, so that increasing efficiency and quality is a general goal and/or a motivation to combine the references, for any speaker recognition system. Based on above reason, the claim rejection will be sustained (see detail in the claim rejection of the office action).

Specification

4. The disclosure is objected to because of the following informalities:

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- a. On page 8, equation (1), the function " $P(u_i | M(i, j, (i, t)))$ " appears to be --
 $P(u_i | M(i, j(i, t)))$ --. Appropriate correction is required.

Claim Objections

5. Claim 2 is objected to because of the following informalities:

Regarding claim 2, the claim status should be changed to "Currently Amended" (not "Original"). Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 13 and 26 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 13 and 16, the variable C is not defined in the claim, which leads the claim to be indefinite.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-3, 6-12, 14-16, 19-25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goldenthal et al. (US 6,205,424) hereinafter referenced as Goldenthal, in view of Newman et al. (US 5,946,654) hereinafter referenced as Newman.

Regarding **claim 1**, Goldenthal discloses two-staged cohort selection for speaker verification system (title), comprising:

“providing a model corresponding to a target speaker, the model being resolved into at least one frame”, (column 3, line 64 to column 4, line 29, 'the frames...processed by a model generator to produce sets of acoustic models which characterize the original speech signals', 'one set of acoustic models for every identified speaker (target speaker) desiring enrollment');

“receiving an identity claim”, (column 1, lines 47-49, 'the claimed identity of an individual can be verified by having the individual utter a prompted sequence of words or spontaneous speech during a testing session');

“ascertaining whether the identity claim corresponds to the target speaker model”, (column 1, lines 56-57, 'if the score exceed a predetermined threshold its presumed that the individual is who he or she claims to be');

“said ascertaining step comprising the steps of: determining, for each frame [and each level] of phonetic detail of the target speaker model, a likelihood value; and resolving the at least one likelihood value to obtain a likelihood score”, (column 1, lines 50-57, 'these validation or testing speech signals are analyzed and compared with the pre-stored observation models corresponding to the "claimed" identity to determine scores', 'the scores can be expressed as log likelihood scores: $\text{score} = \log p(O/I)$, where p represents the likelihood that the observed frames O were produced by the individual I ').

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But, Goldenthal fails to expressly disclose “capable of having a plurality of levels of phonetic detail of varying resolution for each frame” and determining a likelihood value for “each level” of the phonetic detail of target speaker model. However, these features are well known in the art as evidenced by Newman who, in the same field of endeavor, discloses speaker identification using unsupervised speech models (title), comprising that that 'each word 700 (Fig. 7) is represented by a set of phonemes 705 that represent the phonetic spelling of the word', and 'each phoneme is represented by three sets of model parameters 710 that correspond to the three nodes of the phoneme' (column 6, lines 29-34), which suggests that the system includes multiple levels of phonetic detail and the corresponding processing for each level, as claimed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Goldenthal by specifically providing multiple phonetic detail levels and the corresponding processing, as taught by Newman, for the purpose of increasing efficiency and quality of a recognition system.

Regarding **claim 2** (depending on claim 1), Goldenthal in view of Newman further discloses “for each frame and each level of phonetic detail likelihood value is a maximum likelihood value” (Goldenthal: column 1, lines 53-54, 'the a log likelihood score'; column 2, lines 21-31, the log likelihood 'function f can be statistical ... maximum').

Regarding **claim 3** (depending on claim 2), Goldenthal in view of Newman further discloses “said step of resolving the at least one likelihood value comprises averaging the at least one likelihood value”, (Goldenthal: column 1, lines 53-54, 'the a log likelihood score'; column 2, lines 21-31, the log likelihood 'function f can be statistical ... average').

Regarding **claim 6** (depending on claim 1), Goldenthal in view of Newman further discloses “the at least one level of phonetic detail comprises at least one of the following: a global level; a phonemic level and a subphonemic level”, (Goldenthal: column 4, lines 8-29, 'a segment based speech approach to speech processing' and 'that designated segment can be units of speech, for example, phones, or transition from one phone to another').

Regarding **claim 7** (depending on claim 6), as stated above (see claim 1), Goldenthal in view of Newman discloses “the at least one level of phonetic detail comprises all of the following three levels: a global level; a phonemic level and a sub-phonemic level” (Newman: column 6, lines 29-34, 'each word 700 (Fig. 7) is represented by a set of phonemes 705 that represent the phonetic spelling of the word, and each phoneme is represented by three sets of model parameters 710 that correspond to the three nodes of the phoneme', which reads on the claim).

Regarding **claim 8** (depending on claim 7), Goldenthal fails to expressly disclose “providing labeling information for each frame.” However, the feature is well known in the art as evidenced by Newman who further discloses the labeling information in Figs 5-6 and 8. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Goldenthal by specifically providing labeling information for each frame, as taught by Newman, for the purpose of increasing efficiency of a recognition system.

Regarding **claim 9** (depending on claim 1), Goldenthal in view of Newman further discloses “accepting or rejecting the identity claim”, (Goldenthal: column 1, lines 50-57, 'if the scores exceed a predetermined threshold, it is presumed that the individual is who he or she

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claims to be'; Newman: column 2, line 44, 'Bayesian adaptation approach'; which necessarily includes accepting or rejecting the identity claim).

Regarding **claim 10** (depending on claim 1), as stated above, Goldenthal in view of Newman discloses "comparing a quantity based on the likelihood score to a predetermined threshold value", (Goldenthal: column 1, lines 50-57, 'if the scores exceed a predetermined threshold, it is presumed that the individual is who he or she claims to be').

Regarding **claim 11**(depending on claim 10), Goldenthal in view of Newman further discloses "the steps of providing at least one model corresponding to at least one background speaker; and determining the quantity based on the likelihood score via employing the at least one background speaker model", (Goldenthal: column 4, lines 49-58, 'a plurality of sets of "cohort" models (CM) 170 (Fig. 1) which characterize the speech signals of each identified speaker, are selected from the available sets of acoustic models of the other speakers', 'the selection can be made according to predetermined selection criteria, for example, the models which best characterize the speech of the identified speaker, or the models whose characterization fits some predetermined probability density function', which suggests that the combined system has capability of implementing the functionality as claimed).

Regarding **claim 12**, (depending on claim 11), Goldenthal in view of Newman further discloses "said step of determining the quantity based on the likelihood comprises determining a log-likelihood ratio based on the likelihood score", (Goldenthal: column 2, lines 21-28, 'that during testing, the score obtained from the models of the speaker whose identity is claimed is compared with all of the scores derived from the small set of cohort models to produce a set of score differences, and the differences are then used as a normalized score = $\log p(O/I) - f[\log p$

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($O/(C_k(I))$], where $\log p(O/(C_k(I)))$ are the scores for the k cohorts linked to the claimed individual').

Regarding **claims 14-16 and 19-25**, they recite an apparatus. The rejection is based on the same reason described for claims 1-3 and 6-12, respectively, because claims 14-16 and 19-25 recite same or similar limitation(s) as claims 1-3 and 6-12, respectively.

Regarding **claim 27**, it discloses a program storage device readable by machine, which corresponds to the method of claim 1. The rejection is based on the same reason described for claim 1 because the claim recites same or similar limitation(s) as claim 1.

Allowable Subject Matter

8. Claims 4-5, 13, 17-18 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for the allowable subject matter:

Regarding **claim 4**, the prior art of record fail to specifically disclose or fairly suggest a way to determine the likelihood value through a particular equation, as described in the claim, which calculates the likelihood score by using multiple levels of phonetic detail of the speaker model, each level may have multiple processing units, wherein the multiple levels (L) is interpreted as more than one level in most of processing situation.

Regarding **claim 5**, it is dependent claim of the claim 4 and includes all features of its parent claim(s).

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Regarding **claim 13**, as best understood in view of the objection (see above), the prior art of record fail to specifically disclose or fairly suggest a way to provides the log-likelihood ration calculation, as described in the claim, employing multiple levels of phonetic detail of the speaker model and background speaker models, wherein each level may have multiple processing units, wherein the multiple levels (L) is interpreted as more than one level in most of processing situation.

Regarding **claim 17,18 and 26**, they are they disclose an apparatus, which corresponds to the method of claims 4, 5 and 26, respectively. The apparatus is inherent in that it simply provides structure for the functionality found in claims 4, 5, and 26, respectively.

The prior art of record provided numerous teachings of alternating types of speaker recognition, identification and verification. However, the features as presented above are not anticipated by, nor made obvious over the prior art of the record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

9. Please address mail to be delivered by the United States Postal Service (USPS) as follows:

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Effective January 14, 2005, except correspondence for Maintenance Fee payments, Deposit Account Replenishments (see 1.25(c)(4)), and Licensing and Review (see 37 CFR 5.1(c) and 5.2(c)), please address correspondence to be delivered by other delivery services (Federal Express (Fed Ex), UPS, DHL, Laser, Action, Purolater, etc.) as follows:

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qi Han whose telephone numbers is (703) 305-5631. The examiner can normally be reached on Monday through Thursday from 9:00 a.m. to 7:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (703) 305-9645.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Inquiries regarding the status of submissions relating to an application or questions on the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028 between the hours of 6 a.m. and midnight Monday through Friday EST, or by e-mail at: ebc@uspto.gov. For general information about the PAIR system, see <http://pair-direct.uspto.gov>.

QH/qh

March 10, 2005



**DAVID D. KNEPPER
PRIMARY EXAMINER**